Evaluating the Impact of Economic Sanctions on South Africa: A Synthetic Control Approach

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Uhuru, Malebo

MLBUHU001

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Supervisor: Dr Grieve Chelwa

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ABSTRACT

This research paper applies the synthetic control method to measure the economic cost of sanctions imposed on South Africa between 1985 and 1994. The economic sanctions imposed on South Africa between 1985 and 1994 by the United Nations, the United States of America, and the European Community negatively affected the economy. This negative effect on the economy, measured by the gross domestic product per capita, continued until 1998 despite the sanctions having ended four years earlier. Using the synthetic control method, this research paper measures the economic cost by estimating the difference in the gross domestic product per capita between the treated country (South Africa) and the counterfactual (synthetic South Africa). Synthetic South Africa represents South Africa without undergoing treatment (sanctions). What would have happened if sanctions were not imposed? The results indicate that the economic cost is most pronounced after the sanctions ended, indicating a substantial lag effect. South Africa's gross domestic product per capita is 30% lower than synthetic South Africa by 1998. This potentially indicates that the sanctions had a long-lasting effect. The results are not sensitive to the composition of the donor pool. Furthermore, the placebo tests reveal that the results are statistically significant at the 10% threshold with only one country (Philippines) having a treatment effect that is larger than South Africa's and a better fit. For target nations, it means that policy makers should acknowledge that a policy that leads to sanctions may have a severe and long-lasting impact on the economy. Potential areas for future investigation include estimating the humanitarian effect of the sanctions imposed on South Africa and applying the synthetic control method approach to other sanctions episodes in the past.

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LIST OF ABBREVIATIONS AND ACRONYMS

Acronym	Definition
ANC	African National Congress
AGOA	African Growth & Opportunity Act
CAAA	Comprehensive Anti-Apartheid Act
COSATU	Congress of South African Trade Unions
FDI	Foreign Direct Investment
EC	European Community
GDP	Gross Domestic Product
GNP	Gross National Product
IFC	International Monetary Fund
MNC	Multinational cooperation
NAFTA	North American Free Trade Agreement
NP	National Party
OPEC	Organisation of Petroleum Exporting Countries
SADF	South African Defence Force

SADC	South African Development Cooperation
SCM	Synthetic Control Method
SSA	Sub-Sahara Africa
SOEs	State-owned Enterprises
RMSE	Root Mean Square Error
UN	United Nation
UK	United Kingdom
US	United Sates of America

CHAPTER 1: INTRODUCTION

1.1 Background and Context of the Research Paper

Starting in the 1960s, South Africa (SA) increasingly became a pariah in the international community because of its racial discrimination policies, political marginalisation, human rights abuses, and international aggression (Crawford & Klotz, 1999) (Evenett, 2002). Several actors in the international community started to impose sanctions, implementing a diverse range of voluntary and mandatory restrictions on relations with SA (Crawford & Klotz, 1999).

According to Crawford and Klotz (1999) and Evenett (2002), anti-apartheid activism began in the 1960s and peaked in 1985 in response to the state of emergency. Apartheid was a system of racial oppression that was legalised in 1948. Legally, all races were treated unequal, had different economic opportunities (that favoured white people), and had to live separately. In 1985, the United Nations (UN) imposed voluntary comprehensive economic sanctions on SA that restricted new investment and trade. The UN encouraged member countries to supplement the voluntary sanctions. The United States (US) Congress imposed sanctions on SA in 1986 to encourage the government to end its policy of apartheid (Friedman, 1991, p. 2). It banned all trade with South Africa and prohibited US banks from lending money to the SA government or making new investments. The European Commission (EC) and Nordic Council also piled on more economic sanctions on SA during that period.

The US put in place five conditions that needed to be met before these sanctions were lifted: "1) lifting the state of emergency, 2) legalise democratic parties, 3) repealing the Group Areas Act, 4) repealing the Population Registration Act, and 5) release of political prisoners" (Friedman, 1991). The US sanctions were lifted in 1991, after the US President declared that these conditions were met (Friedman, 1991, p. 3). Other sanctions, however, remained in place, such as limited lending from the International Monetary Fund or the Export-Import Bank (Friedman, 1991). The UN sanctions were lifted in 1994, the same year that SA had its first democratic election.

Sanctions were widely used since the end of World War I as a tool to influence foreign governments. There has been insightful research such as Hufbauer, Schott, and Elliot (1990), Kaempfer and Loewenberg (2007), and Neuenkirch and Neumeier (2014) about the effectiveness of sanctions to prompt the desired actions in the target nation. These studies differ

in the approach and metrics employed to measure effectiveness, the factors that contribute to this effectiveness and the policy implications of those findings. Research on the economic costs is limited and tends to apply traditional econometric techniques (e.g., regressions) or case studies.

This paper further contributes to the sanctions research by analysing the economic cost of the sanctions against SA in the period 1985–1994, using the synthetic control method (SCM). It leverages the work done by Gharehgozli (2017) when evaluating the impact of sanctions on Iran from 2011 to 2014.

1.2 Statement of Research Problem and Questions

The impact of economic sanctions from 1985 to 1994 on South Africa has not been evaluated using modern econometric techniques. The extent to which this impact has affected the economy is contestable in terms of the different econometric techniques used and other assumptions that have been made. This research paper focuses on the impact of the economic sanctions imposed from 1985 to 1994 on SA. This research paper will measure the impact of sanctions on SA's economy by looking at trends in the gross domestic product (GDP) per capita. The rationale behind this research paper is to evaluate the impact, if any, of the economic sanctions of the UN, US, EC and others on SA's economy. The economic impact will be assessed using the SCM.

1.3 Research Questions and Objectives

What are the economic costs that SA suffered due to the economic sanctions imposed on it between 1985 and 1994? The hypotheses to be evaluated in this research paper address the research question in the previous section. The hypotheses are:

- H_1: Economic sanctions had a large negative impact on SA's GDP per capita between 1985 and 1994
- H_2: Economic sanctions on SA continued to have a negative impact after they had ended

1.4 Significance of the Research

The rationale behind this research paper is to evaluate the financial cost of economic sanctions using the latest research techniques (SCM). It also intends to determine if the effects have had a long-lasting impact on the economy. A significant gap in the analysis is that none of the existing literature estimates the economic cost of sanctions by comparing the growth path (GDP per capita) after the imposition of sanctions versus had sanctions not been imposed for SA. Those that evaluate the cost of economic sanctions focus on the period during which they were implemented instead of considering the longer-term effects. The effectiveness and efficiency of the sanctions against SA from the mid-1980s is contentious. This research paper aims to contribute to this debate by establishing the economic cost using the SCM.

1.5 Limitations of the Research Paper

This research paper focuses purely on the cost of economic sanctions imposed on SA in the 1980s. The question of the appropriateness and efficiency of economic sanctions is not addressed. This paper does not hold a position on which types of sanctions are justified. Unlike many studies that analysed the sanctions on SA, this paper does not set out to evaluate the role sanctions played in SA's transition to democracy (Crawford & Klotz, 1999). Other aspects and impacts of the US Comprehensive Anti-Apartheid Act such as the US relations with the ANC and imposition of labour practices for US nations are not considered (Redden, 1988).

1.6 Organisation of the Research Paper

The next section will be a literature review followed by a discussion on the methodology and an analysis of the results of the analysis. The literature review will discuss the existing theories about the impact of sanctions, elaborate on the economic cost of sanctions, expand further on SA's experience with sanctions, and consider the appropriateness of various methodologies. The methodology section evaluates the SCM versus other alternative methods and explains how the methodology will be applied to the research problem. A discussion of the results illustrates the key output through charts or tables and discusses the relevant trends. Lastly, the conclusion discusses the main insights of the research paper and highlights some areas for further research and exploration.

1.7 Overview of Economic Sanctions

This section provides an overview of economic sanctions. Since the end of World War I, sanctions were used to replace and or supplement war (Malloy, Carter, Wing , & Oliver, 1990). Sanctions are an alternative to war and supplement other diplomatic efforts (Hotton, 2016). Baldwin (1999) notes that while military force is hardly ever employed without diplomacy or economic sanctions, suggesting that diplomacy and economic sanctions are relevant to all issues where war is considered appropriate, the reverse does not hold (Baldwin, 1999). Sanctions are imposed when the domestic pressure for the local government to act against the foreign government to encourage it to change its policy, but diplomacy or propaganda would not be adequate responses and military action would be too severe (United States General Accounting Office, 1992). Sanctions are measures taken by countries (senders) against other countries (targets) (Frank, 2006). But sanctions can also be undertaken by international organisation, companies, universities, and individuals (Crawford & Klotz, 1999).

According to Frank (2006), sanctions can be unilateral or multilateral, comprehensive (total economic embargoes) or selective, military (use of armed force, arms embargoes, and termination of military assistance), and economic or non-economic (restrictions to participate in cultural and sporting events) (Illieva, Aleksandar , & Kokotovic, 2018). These sanctions can be targeted at an entire country, including all corporations and individuals or restricted to specific individuals.

This paper focuses on economic sanctions imposed by other countries. Crawford and Klotz (1999) define economic sanctions as "the denial of customary interaction of financial resources or products to the target, boycotts of the target state's products, seizures of financial or real-estate assets held outside the target's borders, and isolation of the target in material economic terms" (Crawford & Klotz, 1999, p. 5). While Hotton (2016) defines them as "manipulation of taxation, imports, exports, foreign aid, access to markets or to financial institutions". Both these definitions indicate that the economy of the target will be negatively affected by the actions of the sender nation.

Economic sanctions can adversely affect the target state by decreasing the volume exports and imports, causing high inflation, decreasing investment flows coming into the country, withdrawal of FDI, and reputational damage leading to other unintended consequences

(Neuenkirch & Neumeier, 2014). Trade sanctions restrict the import and exports to and from the target country while financial sanctions restrict the flow of money (Mossuyt, 2018). The extent of these effects, however, depends on the target government's economy, the role of third-party states, and the impact of the sanctions on the sender nation. The impact of sanctions on the target economy will be discussed in more detail in the literature review section on the cost of economic sanctions.

1.7.1 Who Can Impose Sanctions?

The target nation can impose sanctions against a sender using several mechanisms. Sanctions can be imposed by government, the head of state, legislative organs or state institutions that oversee issues related to international diplomacy, and heads of international organisations (Afesorgbor, 2019). Each of these depends on the internal regulations within the sender nation. Given the UN, EC, and US regularly use sanctions as punitive measures against target nations, this section will elaborate on the different mechanisms they apply to impose sanctions.

The UN implements comprehensive sanctions through the Security Council. The Security Council can only employ enforcement measures when there is an international breach or threat of peace and or an act of aggression (Hotton, 2016). The UN employed the first sanctions in 1966 against Rhodesia (now Zimbabwe). The individual geopolitical interests of each Security Council member trumped the global threat at hand. The UN-led compulsory sanctions, therefore, are rarely imposed but there were quite a few voluntary ones (which are ineffective).

The EC implements sanctions regimes decided by the UN Security Council (UNSC) but also implements its own sanctions without a UNSC mandate (Portela, 2014). Furthermore, the EC often supplements the UNSC sanctions with more stringent measures (Portela, 2014). The EC prefers to use targeted sanctions such as arms embargoes and bans on trade in specific goods (Illieva, Aleksandar & Kokotovic, 2018). Other measures used by the EC include financial, travel, and diplomatic sanctions (Illieva et al., 2018).

Unilateral sanctions are imposed by a single country. These types of sanctions were criticised as contradicting international law because they violate the principle of sovereignty (Burgdorf, 2009). The US regularly deployed using sanctions both as unilateral sanctions or part of multilateral sanctions (Illieva et al., 2018). In some countries, like the US, the President has "unlimited discretion concerning imposing bilateral government programs and export controls

without Congress' approval" (Malloy et al., 1990, p. 203). In the case of a national emergency, the President can use a wide range of commercial and financial coercive measures to preserve national security (Illieva et al., 2018). It, therefore, is effectively easy for a country to impose sanctions on another despite it being contrary to the UN Charter (Illieva et al., 2018). According to Illieva et al. (2018), UN members should not be entitled to impose economic sanctions upon another member or any Sovereign State. Currently, however, there is no universally accepted approach in international law to determine if sanctions are lawful or not (Illieva et al., 2018).

1.7.2 What is the Purpose of Sanctions?

The purpose of imposing sanctions differs and is often disputed. Hufbauer et al. (1985) indicate that the purpose of sanctions is to precipitate policy change, destabilise the government, and or impair the military. Doxey (1998) eloquently said that "motivations for sanctions can be punitive, coercive and expressive" (Doxey, 1988, p. 213). Frank (2006) elaborates further by stating that the objectives for which sanctions could be applied include national security, foreign policy, international trade, and investment dispute resolution. National security objectives, according to Frank (2006), are aimed at deterring aggression, curbing weapons proliferation, and punishing a country that is sponsoring terrorism. Human rights and the promotion of democracy are also common examples of policy changes mentioned by Hufbauer et al. (1985) and Frank (2006). A country will impose sanctions for several reasons, for example, the objective for the US's sanctions against North Korea, included improving the human rights situation, maintaining peace on the peninsula, preventing nuclear proliferation, and promoting peace in the region (Frank, 2006). All these papers indicate that senders use sanctions to protect themselves against an inherent threat or encourage another country to act as per its preferences.

When it comes to the real motivation behind the imposition of sanctions, it is often more than what meets the eye or is said publicly. According to Hefti and Staehelin-Witt (2000), Frank (2006) and Kaempfer and Loewenberg (2007), the purpose of sanctions is more about appeasing and pacifying the local population than it is about achieving the real impact. They substantiate this assertion by arguing that the level of sanctions imposed by the sanctioning country is a function of the relative political influence of the pro-sanctions and the anti-sanctions groups within that country. Malloy et al. (1990) affirm that public perception influences initiating and evaluating the effect of sanctions, but they warn that the public

pronouncement might not be reflective of the real objective. That means, in some cases, the reason communicated by the sender publicly might not be the real objective for imposing sanctions.

1.7.3 Have Sanctions Been Successful?

Evaluating whether sanctions have been successful is often an exercise riddled with controversy. Hufbauer et al. (1985), in their leading publication, measure the success of sanctions as a function of the extent to which the policy objectives were achieved and the extent to which sanctions contributed thereto. According to Pape's criteria (1998), sanctions are successful when the target state conceded to a significant part of the sender's demands, sanctions were applied before the target changed its behaviour, and there is no other explanation for the target changing its behaviour (Pape, 1998). Both these perspectives offer useful tools to evaluate the impact of economic sanctions but the approaches that they use are contested by other scholars in the field (Lam, 1990; Drury, 1998; Hart, 2000).

The type of sanctions imposed influences the effectiveness of sanctions. Financial sanctions and trade sanctions differently affect small countries (Dollery, 1993). Financial sanctions affect capital-intensive import sectors whereas trade sanctions affect the labour-intensive sectors of the economy through income and substitution effects. The extent to which the financial sanctions affect the economy depends on the extent to which the target country can replace or dispense with foreign sources of capital (Kaempfer & Loewenberg, 2007). This is revisited in more detail in Section 9.2.

1.7.4 What Factors Influence the Effectiveness of Sanctions?

It is not only the approach to determine if sanctions were effective, but it is also the factors that explain whether sanctions were effective. Hufbauer et al. (1990) go on to analyse the characteristics that explain why the sanctions were effective, including the type of sanctions, the characteristics of the target state, the senders involved, the motivation of the senders, and the relationships between the target, sender, and third-party states before the sanctions are imposed. Their findings are compared in the literature review to those of other scholars that evaluated the same question.

According to Hufbauer et al. (1990) and Kaemfer and Loewenberg (2007), the following factors contribute positively toward the effectiveness of economic sanctions: the political instability of the target, economic weakness of the target, strong relationship (and strong trade linkages) between the sender and target before the imposition of the sanctions, and a strong democracy. The following factors bear negatively on its effectiveness: involvement of more than one sender country, assistance by third-party states to targets, duration of sanctions (the shorter the duration, the more effective the sanctions), and the size of the sender relative to that of the target. This factors an effective proxy to understand why some countries agree to change their policy direction after they had sanctions imposed on them while others do not.

1.7.5 Regulating Sanctions

Comprehensive sanctions could lead to terrible effects on the economy. Economic deterioration in the target states could lead to worsening the position of the middle class, the departure of the intellectual elite, and a challenging business environment (Portela, 2014). Isolation caused by sanctions could frustrate civil society groups and the political opposition. Unintended consequences have led to a request for greater regulation against economic sanctions. For example, the humanitarian crisis in Haiti, Iraq, and former Yugoslavia can be directly attributed to the sanctions in the 1990s (Crawford & Klotz, 1999). The terrible effects of these humanitarian crises harmed the innocent citizens of these countries.

Economic sanctions are often criticised for their humanitarian impact on innocent people within the targeted countries (Cortright & Lopez, 1991). Allen and Lektzian (2012) found that sanctions could have severe public health consequences, resembling those associated with war. Wesbrot and Sachs' (2019) assessment of Venezuela reveals that sanctions led to a reduction in the average calory intake, increased disease and mortality, and displaced millions of citizens (Sachs, 2019). Afesorgbor (2019) further elaborates that essential products such as food and medical supplies are adversely affected by economic sanctions. Hence, target states suffer detrimental such as increases in malnutrition, infectious diseases, and infant mortality, as was experienced in Yugoslavia and Iraq (Afesorgbor, 2019). Given the grave consequences that sanctions could have on a country and its citizens, a school of thought advocates the greater regulation of sanctions (Afesorgbor, 2019). Most of the countries mentioned by these scholars suffered from a lack of economic growth and political turmoil before the imposition of sanctions, so it is often difficult to ascribe the sources of humanitarian crises to sanctions only.

There is a strong assertion by some scholars that there should be consequences for the unintended harm caused by economic sanctions. For example, Frank (2006) states that countries that impose sanctions should be prosecuted for war crimes when they harm innocent people. Winkler (1999) specifically mentions that countries that impose sanctions must be bound by the "Just War Doctrine" (Winkler, 1999). The "Just War Doctrine" are guiding principles to regulate armed conflict that has been evolving since initially conceived by St Augustine from the Christian doctrine of war (Miller, 1964). It outlines that the war must have a just cause, it must be lawful, and the intention must be good, all other options exhausted, have a reasonable chance of success, and be used in a reasonable proportion to the end.

Frank (2006) argues that if sanctions were regarded as a type of warfare, they would fall under related international regulations. The senders could then be charged for committing crimes against innocent people. Webrot and Sachs (2019) provide further legal justification in the Venezuela case by arguing that "it be defined as collective punishment of the civilian population as described in both the Geneva and Hague international conventions, to which the US is a signatory".

Beyond individual casualties, sanctions could also adversely affect entrepreneurship and small businesses. For example, the US and EC's sanctions against Russia aim to stop the advancement into Ukraine, and they target Russia's financial system. This constrained Russia's financial capital and crowded out small players (Oxenstierna & Olsson, 2015). More broadly, sanctions could bring about severe economic disruption, including hyperinflation and unemployment, which, in turn, result in poverty, malnutrition, and death (Winkler, 1999). This indicates that the broad devastation on the economy also affects private players that are integral to any economy.

1.7.6 Smart Sanctions: How to Limit the Unintended Consequences and Improve the Effectiveness

There are three types of smart sanctions that could be implemented, namely personal sanctions, selective sanctions, and diplomatic measures. Personal sanctions are self-explanatory; they directly affect exclusive individuals (Portela, 2014). These sanctions ban the travel of blacklisted individuals, issuing of visas, and freezing their financial assets abroad. Selective sanctions target specific sectors in the economy. For example, banning the export or import of

specific commodities. Diplomatic sanctions include banning the membership in an international organisation or the recall of ambassadors or limitation of contracts (Portela, 2014). Another example of diplomatic sanctions is the banning of SA sports teams from participating in international games.

The intention behind smart sanctions is to negatively affect the ruling elite so that they submit to the wishes of the sender. There is a view that sanctions work if they have a desired impact on the ruling elite (Kaempfer & Loewenberg, 2007). Rose (2005) argues that punitive measures of sanctions must be used alongside incentives for concessions by the target country. Beladi and Oladi (2015) argue that sanctions should be focused on influential people that can change government policies instead of blanket sanctions that affect innocent citizens indiscriminately (Beladi & Oladi , 2015). Allen and Lektzian (2012) motivate that sanctions must be focused on the elite rather than having unintended consequences such as health effects on the general population. The impact of the Iranian oil boycott was an example of smart sanctions because the reduction in the proceeds from oil and gas created an incentive for the elite to change (Dizaji & Van Bergeijk, 2013). Most of those that argue for smart sanctions do so without providing examples of where they have been effective; the Iranian oil boycott is a unique case that cannot be generalised.

The mechanics of how smart sanctions lead to change is quite interesting, with Beladi and Oladi (2015) arguing that the inclusion incentives further strengthen this approach. Beladi and Oladi (2015) argue that smart sanctions lead to more compliance because they target those in the country who can influence the government's conduct (Galtung, 1983). Cortright and Lopez (1999) refer to this as carrot-and-stick diplomacy, which is designed to resolve conflict and bring about a negotiated solution. Iraq and Yugoslavia are often used as what Beladi and Oladi (2015) term smart sanctions. The Iraq Oil-For-Food programme is an example of a framework focusing on the process of negotiation and concessions for partial compliance. These smart sanctions require rigorous continuous assessment and review to allow for adjustment if necessary (Burgdorf, 2009). It is unclear from this assessment how incentives could be generalised for each situation where one nation wants another to change its policy or stop a specific action.

Theoretically, targeted sanctions correct the unintended consequences of sanctions because they do not affect the economy. Sanctions should not interfere with the flow of essential goods

and they should not target goods required to ensure the basic subsistence of the civilian population, nor essential medical provisions or educational material of any kind (Bossuyt, 1999). The relevance of the smart sanctions approach is that it looks to identify ways to reduce the unintended consequences on innocent civilians.

1.7.7 What is South Africa's Experience with Sanctions?

SA has a long history of having sanctions imposed against it as a punitive measure against the apartheid policy/racial discrimination and to encourage policy change. Most of the sanctions before 1985 were by individual nations and non-economic. The earliest sanctions were imposed in 1946 by India through a trade embargo (Manby, 1992). Soon after, African countries gained independence in the 1960s, and applied unilateral sanctions against SA (Manby, 1992). Both India and other African countries were small trade partners of SA and these sanctions were on limited products.

In 1963, a UNSC resolution recommended that members stop the shipment of arms to SA. It was a voluntary arms embargo because the US and UK opposed any broader actions against the apartheid government (Roekel, 2016). These voluntary arms embargoes were not economic sanctions. Japan implemented a unilateral ban on direct investment in 1964. Although this was a significant measure, Japan was not a major investor in SA at the time.

Throughout the 1970s, there were widespread consumer boycotts in the US, which escalated after the 1976 Soweto uprising (Manby, 1992). In 1973, OPEC, through a request by the Organisation for African Unity, imposed an oil embargo on SA (Manby, 1992). OPEC introduced an oil embargo against all supporters of Israel. The oil embargo negatively affected aspects of the South African economy but it was not a comprehensive punitive measure on SA.

Weak sanctions were imposed in 1973 by the UN aimed at limited the purchasing of arms (Manby, 1992). Following the Soweto 1976 violence against scholars, the OPEC oil embargo was followed by a mandatory UN arms embargo in 1977. In the US, some companies instituted the Sullivan Principles, which made it difficult to raise new loans for the SA government (Manby, 1992). Another measure in the 1970s was the restriction or prohibition of loans by Denmark, Finland, Norway, Sweden, and Switzerland (Roekel, 2016). At this stage, action against SA through sanctions was being implemented by individual organisations or individual

countries that were not major trading partners of SA. Most importantly, these were not comprehensive economic sanctions by major trade partners.

Multinational institutions and major trade partners started to act against SA in the 1980s. The first international financial institution sanctions were implemented in 1983 by the IMF (Roekel, 2016). The IMF refused to grant additional funds to SA in 1983 because of an initiative led by the US Congressional Black Caucus (Crawford & Klotz, 1999). This was a once-off action rather than economic sanctions imposed for a period.

A 1984 UNSC Resolution instituted a voluntary arms embargo (Crawford & Klotz, 1999). The UN called for the end of discrimination, release of political prisoners, and a move toward a peaceful transformation (Crawford & Klotz, 1999). These were not economic sanctions nor were they compulsory, so they are not considered for the period of analysis.

Starting in 1985, major economic sanctions were instituted by multilateral institutions and important trade partners to SA (Manby, 1992). The UN had a voluntary ban on new investment, trade, and other economic activities against SA (Manby, 1992). The UN requested that member states should impose additional sanctions to supplement the voluntary sanctions (Manby, 1992). The EC agreed to participate in the arms and oil embargoes. In August 1985, SA's major lenders refused to refinance the short-term debt, leading to the rand depreciating by half (Manby, 1992). Later in 1985, the Nordic Council (Denmark, Finland, Iceland, Norway, and Sweden) imposed sanctions on new investments and selected imports from SA. These actions by the UN, EC, Nordic Council, and major lenders are considered the start of the comprehensive economic sanctions on SA by multinational institutions. The sanctions starting in 1985 are considered the first severe sanctions episode against SA (refer to Table 3.1 definition of sanctions) (Manby, 1992).

SA's woes worsened when the US also piled on with its economic sanctions. The US Congress passed the Comprehensive Anti-Apartheid Act (CAAA) in 1986. The CAAA banned trade with SA of certain products and financial transactions (new investments including loans) (Manby, 1992; United States General Accounting Office, 1992). Also, in 1986, several international companies divested in SA, including Barclays Bank (the UK's largest investor in SA) (Evenett, 2002). Other important trade partners to SA such as the EC, Commonwealth, and Japan also imposed economic sanctions on SA during 1986–1987 (Ch. Hefti, 1998). In

1987, Sweden and Norway imposed comprehensive trade and investment bans on SA (Evenett, 2002). Great Britain and Germany opted not to impose any binding sanctions (Ch. Hefti, 1998). The CAAA remained in place until 1991 when it was removed by President Bush after the five conditions were met. Given the US's position as a strategic trade partner, Evenett (2002) found that the US sanctions had the strongest influence on SA (Evenett, 2002).

The effectiveness and efficiency of the sanctions against SA from the mid-1980s is contentious. Sanctions should lead countries to make policy changes due to the reduction of available resources to them (Burgdorf, 2009). The sanctions implemented against SA were mild until the 1980s when the UN, EC, EU, and US seriously participated. Britain and the US's, the two main trading partners of SA, reluctance to participate in earlier sanctions explains why the earlier sanctions were weaker (Roekel, 2016). The significance of comprehensive economic sanctions by the UN is that Neuenkirch and Neumeier (2014) found that the imposition of UN sanctions decreases the target state's annual GDP per capita by more than 2% and that the effect lasts for 10 years and leads to an aggregate decline in the target countries' GDP per capita of 25.5%. More specifically, Neuenkirch and Neumeier (2014) found that comprehensive UN economic sanctions have the most detrimental mental effect on a country's real GDP growth.

The key differentiator between these sanctions between earlier periods is that they were economic, comprehensive, imposed by multilateral institutions, and strategic unilateral parties. Previous cases were much milder because they did not include economic sanctions by strategic trade partners such as the US. More importantly, earlier sanctions were selective and limited; while the sanctions during this period were comprehensive (financial and trade) affecting SA's economy more broadly.

Unilateral sanctions started to be lifted after the unbanning of the ANC, and release of Nelson Mandela and other prisoners in 1990 (Evenett, 2002). In 1991, there were further repeals of three laws (the Land Act, the Group Areas Act, and the Population Registration Act) central to the apartheid regime (Evenett, 2002). The repeals of these laws were key conditions for the sanctions imposed by the UN and EC.

The UN's economic sanctions remained until 1994, while other sender countries such as the US (1991), ended their sanctions earlier in the 1990s. For example, Japan also ended sanctions in 1991, the EC lifted its sanctions in 1992, and India followed in 1993 (Ch. Hefti, 1998). In

1993, the General Assembly requested the removal of economic sanctions against SA when the Transitional Executive Council in SA become operational (Evenett, 2002). It, however, was only in 1994 when the Security Council adopted a resolution to remove all remaining US sanctions against SA (Security Council Report, 2013). 1994, therefore, is the ended data of sanctions for this research paper.

The end of apartheid is attributed to a series of factors and not solely the impact of sanctions. For example, Levy (1999) argues that the end of apartheid could be attributed to the effectiveness of political opposition, the inefficiency of the economy, and the fall of the Soviet Union. The latter was triggered by the fall of communism in Eastern Europe (Levy, 1999). This paper does not wish to enter the debate but solely indicate there were other critical factors that contributed to the demise of apartheid.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The literature on economic sanctions focuses on a wide array of questions, including defining what they are, what they hope to achieve, how effective they have been, analysing the humanitarian effects, and recommending alternative ways to improve the effectiveness and minimise unintended consequences. The research on the effectiveness of economic sanctions was conducted by empirical quantitative research. This research uses a qualitative economic and or political theory to inform how the quantitative method is designed (Kaempfer & Loewenberg, 2007; Neuenkirch & Neumeier, 2014). The other research questions regarding economic sanctions evaluate each determinant of effectiveness in detail, for example, the role of third parties in determining the effectiveness of sanctions. This research used a wide range of research techniques, including political theory, game theory, macroeconomic theory, law, and psychology (Cortright & Lopez, 2001; Rose, 2005; Beladi & Oladi, 2015). This section will critically analyse the literature on the economic cost of sanctions, identify the gaps that currently exist, and areas for future studies.

This chapter will first review the existing theories on the impact of sanctions. Second, it will analyse the literature on economic cost of sanctions, and last, review the literature on sanctions against SA.

2.2 Review of Existing Theories on the Impact of Sanctions

Sanctions are an alternative or supplementary punitive measure, to war and diplomacy, against a target country. After the end of World War 2, sanctions were used more widely against governments to encourage policy change or for the target to stop undesired behaviours. Given the almost 40-year track record from the late 1940s to 1980s, scholars started to interrogate its effectiveness as a policy measure in the mid-1980s. This section evaluates the theories that were derived regarding this work.

Early studies on economic sanctions focus on explaining the factors that make sanctions successful. In their revision of the 1985 study, Hufbauer et al. (1990) evaluated the goal of the sender, relative economic strength, economic stability of the target, the relationship between the target and sender before the sanctions were instituted, the cost of the sanctions to both

parties, and the duration of the sanctions. They found that the following pre-conditions are associated with successful cases: the goal is relatively modest, the target country is much smaller than the country imposing the sanctions and economically unstable, the sender and target conducted substantial trade, the sanctions are imposed quickly, and the sender avoids high cost to itself. Moberly (1988) supports Hufbauer et al.'s (1990) assertion that the objective of the sanctions affects its ability to be effective. These findings by Hufbauer et al. (1990) were developed using detailed case studies of all sanctions during the period of study; it was the most comprehensive study of sanctions at the time.

A major criticism of the analytical approach by Hufbauer et al. (1990) is static (evaluate the cost of sanctions during the period they are imposed) and does not compare determinants over time and across periods. Instead of taking a static view on sanctions, Mirkina (2018) finds that the effect of sanctions on foreign investment changes over time, depending on "sanctions costs, primary sanctions imposer, and the decade". For example, sanctions imposed in the 1990s negatively affected the FDI in the short-term, but the effect dissipated in the long-term. Sanctions implemented during other decades, on average, did not significantly affect the FDI.

Table 2.1: Factors that Influence the Effectiveness of Sanctions

Independent variables	Hufbauer	Lam	Deheija	Van	Dashti-	Bonetti	Drury	Hart	Bolk and	Nooruddin	Jing et al.
				+							
Political instability of target	+	+		+							+
Economic weakness of target	+	+									+
Cordial pre-sanction ties	+	+				+					+
Cost of sanctions to target	+	+	+		+		+	+			
Trade linkages between sender and target		-									
Multilateral cooperation among senders											
Third-party assistance to target							-				
Ambitiousness of sanctions goal					-	-	-				
Sender is frequent sanctioner					-						
Size of sender relative to target											-
Trade versus financial sanctions	-		-	+	-		-				
Duration of sanctions	-			-					-		
Democratic versus autocratic									+	+	

Notes: The table shows variables that influence the effectiveness of sanctions. For each author, it indicates if they found a positive (+) or a negative (-) relationship. A blank cell means that no relationship was found. The table allows us to evaluate the trends between the findings of the authors. (Kaempfer & Loewenberg, 2007)

Table 2.1 indicates that since the publication by Hufbauer et al. (1990) several authors analysed the determinants of the effectiveness of sanctions. The findings, which are supported by other authors, are regarding the role of political instability, political weakness of the target, the relationship before the sanctions, and the cost of the sanctions to the target, positively contributing to effectiveness (Lam, 1990; Van Bergeijk, 1994; Jing et al., 2003). Furthermore, using financial sanctions for about three years was also more likely to make sanctions more effective than trade sanctions that lasted for nine years (Deheija & Wood, 1992; Dashti-Gibson et al., 1997; Bolk & Al-Sowayel, 2000). There is no consensus on trade linkages, multilateral cooperation, assistance from third parties, the goal of the target, and the relative sizes. Despite no consensus being found about the role of third parties, it will be evaluated in more detail in the next section. SA was resilient due to its ability to circumvent unilateral sanctions by being rescued by third parties.

Scholars such as Drury (1998) evaluated Hufbauer et al.'s (1990) findings and found interesting results. According to Drury's analysis, only four of Hufbauer et al.'s policy recommendations are supported by the results, namely: 1) a large difference in the sizes of the economy is not a significant predictor of the likelihood of sanctions being successful; 2) well-coordinated multination sanctions are more effective than unilateral sanctions; 3) the cost to the target as a percentage of its gross national product (GNP) has a significantly positive effect on success; and 4) target countries with weak economies tended to succumb to sanctions more often than strong, healthy targets (Drury, 1998). Following up on the third recommendation, Hufbauer et al. (1990) found that the average cost to the target in successful cases was 2.4% of its GNP and in failures it was only 1.0%.

2.2.1 How Long must Sanctions be Imposed for them to be Effective?

The debate around the effectiveness of sanctions also included the debate around the length of sanctions; how long does it take for them to work? Hufbauer et al. (1990) found that successful sanctions endured on average 2.9 years versus 8.0 years in the case of failures. A major implication from Afesorgbor's paper (2019) is that when a threat is made before the imposition of sanctions, it can undermine the effectiveness of sanctions. The passing of time gives the country enough time to adopt strategies that could counteract the negative effects (e.g., stockpiling) (Afesorgbor, 2019). Afesorgbor (2019) affirms that sanctions that last for longer periods are less successful. SA has a long history of sanctions but the most comprehensive economic sanctions by the US, UN, EC, and other strategic partners lasted for nine years, from 1985 to 1994. Nine years is nearly triple the period that successful sanctions endure.

2.2.2 Multilateral versus unilateral sanctions

The fourth policy recommendation by Hufbauer et al. (1990) was that well-organised sanctions by multinational organisations are more successful than unilateral sanctions. Unilateral sanctions create a smaller deterioration in the target's terms of trade than those involving numerous participant countries. (Kaempfer & Loewenberg, 2007). The significance of the sanctions imposed on SA in 1985 by the EC and Nordic Alliance is that they were compulsory economic sanctions that all members had to follow.

2.3 Economic Cost of Sanctions

In the previous section, the discussion was on the overall factors that determine the effectiveness of sanctions. This sub-section deep-dives into the economic cost of sanctions, not only from the perspective of effectiveness but also the impact on the economy of the target state. Sanctions impose costs on the economy in several ways. Of course, this depends on the type of sanctions that have been imposed. First, sanctions lead to the reduction of the benefits associated with trade. Second, sanctions lead to withdraws of foreign sources of capital. Third, sanctions could cause productive inefficiency by increasing the cost and availability of key inputs (Blumenfeld, 1987). These are the primary mechanisms that economic sanctions could impose costs on the target country.

The methodologies to evaluate the economic costs of sanctions are varied. Neuenkirch and Neumeier (2014) evaluate the impact of sanctions on GDP growth using econometric modelling. The IMF and Davies (2018) also used econometric modelling to assess the impact of sanctions on economies. The case study approach was applied to several sanctions' episodes, including Russia. More recently, Mirkina (2018) applied the SCM to assess the impact on Russia's exports, while Gharehgozli (2017) used the SCM to assess the impact of sanctions on Iran's GDP. Each of these approaches is expanded on below.

Shin and Choi (2015) evaluated the impact of sanctions by using a cross-national, time series data analysis of 133 countries during the period 1970 to 2005 to determine if economic sanctions impaired these targeted economies. Shin and Choi (2015) found that regardless of the number of senders, the type of sanctions or the level of anticipated costs to the target and the sender, sanctions do not damage the economic conditions (international trade, FDI and portfolio flows) of the target. According to Shin and Choi (2015), this happens because MNC does not "rally around the flag" but instead conducts business as usual with sanctioned countries because they are profit seeking organisations rather than politically motivated entities.

Neuenkirch and Neumeier (2014) used econometric modelling to evaluate the impact of US and UN Economic Sanctions on GDP growth. They assessed 68 countries between 1976 and 2012 (Neuenkirch & Neumeier, 2014). They found that UN sanctions led to a decrease in the target state's real GDP per capital growth rate by 2.3–3.5% (Neuenkirch & Neumeier, 2014).

Interestingly, they found that the adverse effect lasts for approximately 10 years. The impact of US sanctions was small (0.5% –0.9%). The econometric approach is useful because it allows for the specific characteristics of the target and sender countries to be factored in and the nature of the sanctions are incorporated into the model. Critics against the econometric model argue that it has more historic explanatory usefulness rather than predictive relevance. These models can derive insights based on past events. They, however, have limited predictive relevance because the selected discrete variables will always be up for debate.

The economic cost of previous episodes of economic sanctions is often easier to quantify. Davis (2018) evaluated the average cost of sanctions and derived an econometric model to evaluate the average cost of sanctions depending on the characteristics of that specific episode and country (Davies, 2018). For example, Davis (2018) estimated that the 2014–2017 sanctions on Russia reduced the GDP by 2–2.5%, and the economy is projected to grow at 1.5–1.7% until 2023, which is lower than global growth estimations of 3.7–3.9%

The macroeconomic models were used by the IMF to estimate the reduction in growth in Russia because of sanctions. They attempt to do this while also indicating the effect of other factors such as the lower oil price and restrictive macroeconomic policies (Korhonen, 2019). The effects of sanctions were also evaluated through a structural auto-regressive model that can delineate the effect of sanctions during different periods. They found the negative effect most pronounced during 2014–16 (Korhonen, 2019).

Evidence of research to estimate the cost of sanctions that were not imposed is limited. An example is when the former Russian Minister of Finance, Alexei Kudrin, stated that sanctions lead to a 1–1.5% drop in the GDP (Smeets, 2018). The facts to derive this conclusion are not publicly available. It did, however, reveal the view of the Russian government's evaluation of the threat. In another example, the US Treasury Secretary, Jacob Lew, estimated the cost of the 2011 sanctions on Iran to have caused a 15–20% contraction in the economy (Smeets, 2018). There was a two-year recession in Iran following the US sanctions imposition, the currency (Rial) depreciated by 56% over those two years, and unemployment reached record levels. These estimations by both the target and sender government seem to have a much more negative impact on the economies than empirical findings of academic studies.

A counterfactual analysis based on the econometric model was used to assess the effect of sanctions on the EC countries' exports to Russia (Korhonen, 2019). This analysis also segments the impact by sector and found that the largest drop in exports was in agricultural goods. The cases of Burundi, Iran and Russia show different perspectives on how economic sanctions may affect target nations (Dom & Roger, 2020; Kokabisaghi, 2018).

Based on the outcome of Burundi's 2015 sanctions, Dom and Roger (2020) maintain that sanctions do not have an economic impact on the economy because governments have several fiscal levers they can use. The sanctions on Burundi cut the access to aid but instead led to an increase in domestic borrowing. The Burudian government was able to withstand the sanctions and deliver its spending commitments by substituting domestic debt for aid. This indicates that the economic costs of sanctions do not necessarily translate into political costs but are affected by the fiscal responses that are available to government (Dom & Roger, 2020).

On the other hand, sanctions against Iran caused the country's revenues to fall, a devaluation of national currency and an increase in inflation and unemployment (Kokabisaghi, 2018). Kakobiasghi (2018) argues that the impact of sanctions not only directly affects the economy but also translates into a pronounced deterioration in the quality of life.

According to Tyll (2018), the impact of sanctions on the economy of Russia was made worse by that country's dependence on oil exports. There was a large capital outflow from Russia as a result of the sanctions imposed due to the Ukraine crisis but the study finds that the economic condition of Russia was also affected by its dependence on oil exports and the oil prices at the time (Tyll, 2018). The exchange rate management also had negative effects on the disposable income of citizens.

These three case studies show us that the unique attributes of each country explain the economic cost of sanctions and that the appetite of governments to use alternative sources of liquidity will also influence the impact of sanctions on their economies.

The SCM was recently used as an alternative approach to measure the economic cost of sanctions for a single country. The method was developed by Abadie and Gargeazalbal (2003) to evaluate the impact of the Basque war on the economic performance of the region. Mirkina (2018) used the SCM to analyse the economic cost of sanctions in examining the effects of sanctions on foreign direct investments and Gharehgozli (2017) used it to assess the impact of

sanctions on Iran's GDP (Barseghyan, 2019). This new approach provides a new way of analysing the economic cost of sanctions.

2.4 South Africa's Experience with Economic Sanctions – What was the Impact?

SA has been a case study of interest for evaluating sanctions due to the long history of sanctions against the apartheid government. Crawford and Klots (1999) authored a book that analysed the efficacy of sanctions as a policy tool and the role it played in SA's transitions. The book, *How Sanctions Work: Lessons from South Africa,* starts by providing the historical context of sanctions globally and then go on to explain how different types of sanctions were imposed on SA (Crawford & Klotz, 1999).

The reaction of the SA government to sanctions is well-documented by Mobberley (1988). According to Mobberley (1988), the earlier sanctions led to the SA government building a "formidable arms industry, developing oil substitutes, and purchasing oil through third parties". This explains why the SA government persisted with apartheid despite the earlier arms and oil embargoes that were imposed during the late 1970s.

Levy argues that it is particularly challenging to measure with any sort of precision the impact of the sanctions, given that the economic growth slowed down from 5.4% in the prior decades to 1.8% in the period 1974–1987. It, therefore, could have been the weakening economic situation due to international pressure that contributed to the government changing its position.

Before the imposition of the sanctions by the UN and US Congress, the major debate was around the likely effectiveness and appropriateness of economic sanctions (Minter, 1986). Minter (1986) argues that there was a false dichotomy in the sanctions debate and that the government rarely accurately communicates its motivation for sanctions. According to Minter (1986), the sanctions debate often underestimates the consequences because they do not consider the long-term consequences, cumulative impact, and interactions with other factors that influence economic and political confidence (Minter, 1986). Moberly (1988) expected US sanctions on SA to have a "clear impact on the export industry, lower new investment, slow growth, exchange rate depreciation, and job losses."

Kaempfer, Lehmen and Loewenberg (1987) explain how disinvestment affects the economy in SA. They argue in the short-term, it will be positive for white South Africans because, as

foreign investors withdraw, it will lead to a fall in the capital prices, but the returns stay the same. South Africans will continue to invest if they realise a higher rate of return. Disinvestment alone, therefore, is expected to lead to an increase in the wealth of white SA capital owners, which enables the state to generate additional revenues (Kaempfer et al., 1987). In the long-term, there is a loss of productivity due to depreciation, and the loss of skilled foreign nations are expected to have a detrimental loss depending on the extent to which they are used alongside trade sanctions (Kaempfer et al., 1987).

SA's dependence on foreign capital rendered it especially vulnerable to the imposition of sanctions that limited access to capital markets (Levy, 1999). During the sanctions period, most of SA's debt was short-term, making SA vulnerable to refinancing risk. Foreign capital was vital to the SA economy to fund the state-owned enterprises (SOEs), develop infrastructure, and growth in the mining sector (Lopez, 2001). The Overseas Development Institute (1986) purports that the structure of the SA economy made it vulnerable to sanctions. This vulnerability was due to the reliance on foreign FDI, dependence on foreign short-term debt, commodity export-led economy (particularly gold sector), and the exchange rate regime (Overseas Development Institute, 1986).

Love (1998) and Coulibaly (2009) also concluded that SA appeared vulnerable to sanctions due to its size, dependence on the global economy, and most of its trade being with the West. In the 1960s, the total liabilities were made up of 45% FDI, 40% loans, and the remainder were made by portfolio investments (Coulibaly, 2009). By 1985, total foreign liabilities as a percentage of GDP increased by 17% to 70% and even worse, the share of loans had increased to 60% with 70% of them maturing within a year (Coulibaly, 2009). According to Coulibaly (2009), the shift in liabilities from FDI and portfolio to debt reflected foreign investors' desire to reduce their risk exposure to SA, leaving the country to rely on loans to meet its investment needs.

This vulnerability was exposed when in 1985, the international lenders refused to refinance 60% of the foreign debt. To make matters worse, most of these lenders adopted policies of not making new loans to SA (Love, 1988). Eventually, a repayment schedule was negotiated in 1987.

The major trade partners (US, UK, West Germany, Japan, and Italy) accounted for over 80% of trade with SA (Manby, 1992). Although the US participated in the sanctions process through CAAA, other major trade partners such as the UK and West German resisted the adoption of compulsory and strong economic sanctions. Louw (1995) states that sanctions of the 1980s could not cause any real damage to the economy. Louw (1995) also found that sanctions had a short-term impact on selected exports. Most interestingly, Louw (1995) contends that the sanctions were deliberately intended to have a minimal impact. According to Hefti and Staehelin-Witt (1998), trade sanctions imposed a greater impact on SA than financial sanctions did. SA could still avoid the full cost of the trade sanctions by selling to new customers or changing the specifications of the product (Ch. Hefti, 1998).

Trade sanctions also had a serious and long-lasting effect on the SA economy. SA's exports stagnated while world trade increased, the cost of selling to non-sanctioning countries affected the profitability, and for some products, SA was forced to sell at a discount to maintain its market share (United States General Accounting Office, 1992). The country also had a higher interest rate than the market rate. Sanctions also cause inefficiencies in the target economy when new industries must be created to substitute for more expensive or scarce imports. For example, the multilateral oil and arms embargoes against SA led to opaque investments in expensive and inefficient arms and synthetic fuel industries (United States General Accounting Office, 1992). Import substitution industries are achieved at an opportunity cost to more strategically advantageous industries (Bossuyt, 1999). Taxation to raise money for these import substitution industries also distorts investment patterns (United States General Accounting Office, 1992).

Rodman (1994) highlights that private sector organisations and individuals played a pivotal role in ensuring the success of sanctions. Actions of the public (citizenry of the sender) are always more effective when they are supplemented by some type of public policy (Rodman, 1994). Manby (1992) also indicates that punitive action against SA during the 1980s was imposed by international organisations, individual governments, and non-state institutions.

The evaluation of the economic cost of sanctions on SA during the period differs in the approach to estimate the impact. Crawford and Klotz (1999) estimate that although trade fell with major trade partners during the period, it also increased with others (e.g., Japan increased 20% in 1987). A key insight from the assessment of Crawford and Klotz (1999) is that the

decisions of countries and corporations rested more on the strategic nature of the relevant industry; they were more likely to ban goods for industries they were trying to protect locally.

The increasing political uncertainty and poor economic climate in SA made the economy a poor investment destination (Manby, 1992). According to Hefti and Staehelin-Witt (1998), SA suffered a net outflow of R16.2bn during the sanctions period but this disinvestment trend started before the introduction of the 1985 sanctions. The largest net capital outflow occurred in 1985 before the imposition of economic sanctions by the US in 1986 (Ch. Hefti, 1998). According to Hefti and Staehelin-Wit (1998), the official sanctions had limited impact on capital outflow because they were on new investments and not enacted as compulsory by all trade partners. The fundamentals did not stack up, and irrespective of a willingness to participate in the sanction, it did not make financial sense to continue investing in SA for investors (Levy, 1999). Interestingly, over 80% of all FDI in SA during the period was reinvested profits, not new investment. Halon (1990) found evidence of the impact of sanctions, including 7% of trade being cut, selling coal at lower prices, disinvestment associated with no new investments, capital outflows, and no access to loans (Halon, 1990).

Most of the literature on economic sanctions in SA were written during the period where sanctions were imposed. Few studies such as Hefti and Staehelin-Witt (1998) reflect on the conclusion of these sanctions. Another paper that was written after sanctions ended was by Coulibaly (2009). It analysed the effect of sanctions on investment and economic growth using time series data of the SA economy. The results of the study found that sanctions did negatively affect the economy (Coulibaly, 2009).

The end of sanctions was gradual, with some sanctions relaxed after the release of Nelson Mandela in 1990 (Crawford & Klotz, 1999). The CAAA remained in place until 1991 when they were removed by President Bush after the five conditions were met. The UN sanctions, however, were only lifted in 1994 in the year that democratic elections took place.

2.5 Conclusion

A significant gap in the analysis is that none of the existing literature estimates the economic cost of sanctions by comparing the growth path (GDP per capita) after the imposition of sanctions versus had sanctions not been imposed for SA. Those that evaluate the cost of economic sanctions focus on the time during which they were implemented instead of

considering the long-term effects. The new trend of using the SCM offers an opportunity to apply the same methodology to the South African case in the 1980s. Past studies offer useful explanatory variables. The literature evaluates the level of effectiveness, explains the features that contribute to this effectiveness, identifies the unintended consequences, and conducts individual case studies. These explanatory tools could be used to explain the size of the economic costs found by using the SCM to the SA case. This research paper aims to focus on the impact of economic sanctions on SA during the period 1985 to 1994 by using the SCM.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter will first introduce the SCM, evaluate it against other comparable methods, and explain how it will be used in the rest of the paper. The previous chapter (literature review) briefly highlighted how this approach was used to evaluate economic sanctions in the past. An evaluation of comparable methods elaborates on the advantages and disadvantages of the SCM over others (case study, trial-and-error, difference-in-difference). Last, the key units of measure are defined, data sources are provided, and the logic behind the equation to be used for the analysis is also discussed.

3.2 Synthetic Control Method

To evaluate if a policy is effective, researchers often study the impact of a policy decision. The SCM is well-regarded as an effective approach that could help to evaluate the effectiveness of policies (McClelland & Gault, 2017). It has been applied in single country and multi-country evaluation papers across a wide series of topics.

SCM is an econometric technique that performs data-driven and transparent comparative case studies (Billmeier & Nannicini, 2013). The SCM provides a method to compare the real economic trend of a country against a synthetic country that resembles its growth had the incident (e.g., sanctions) not occurred (Chelwa, Blecher, & Van Walbeek, 2015). The synthetic country would replicate the GDP per capita (the observed variable) that the country would have experienced in the absence of sanctions (the intervention). The SCM creates a counterfactual region by taking the weighted average of pre-intervention outcomes from selected donor pools (McClelland & Gault, 2017), and the quality of inference increases with the number of countries available pre-intervention period. Simply put, the effect of sanctions (treatment) is estimated by comparing trends in per capita GDP for a country with and without sanctions (Pchelintsev, 2019). It is an appropriate technique to use for what this research paper is endeavouring to achieve.

The SCM is a relatively new technique that was introduced in 2003 by Abadie and Gardeazabal (2003) evaluating the economic cost of the Basque War in the 1960s between Spain and the Basque National Liberation Movement (Abadie & Gardeazabal, The Economic Costs of

Conflict: A Case Study of the Basque Country, 2003). It was extended by Abadie, Diamone and Hainmueller (2010). Billmeier and Nannicini (2013) have since applied the methodology to evaluate the impact of liberalising economics. Billmeier and Nannicini (2013) applied the method to cross-country econometric techniques to perform comparative case studies. Using the synthetic control framework, Billmeier and Nannicini (2013) evaluated if liberalising an economy leads to higher economic performance after the intervention when compared to similar countries that had not liberalised their economies.

The SCM was used to analyse the impact of policy interventions in SA. The SCM was used to measure the effect of price hikes through tax hikes on cigarette consumption in SA (Chelwa , van Walbeek, & Blecher , 2017) to evaluate the impact of SA's tobacco control policies from 1994 to 2004. They do this by estimating SA's counterfactual cigarette consumption trend line. This synthetic SA resembles SA in all relevant aspects, except for the tax hikes. The observed outcome variable for the actual SA is compared to the outcome variable for the synthetic SA (Chelwa et al., 2015). This research paper offers a useful guide to applying the methodology to SA, including the selection of suitable donor pool countries.

Mirkina (2018) used the SCM to analyse the economic cost of sanctions by examining the effects of sanctions on foreign direct investments. Gharehgozli (2017) estimated the economic cost of international sanctions imposed on Iran using the SCM. This research paper leverages this past work to analyse the economic cost of sanctions on SA's economic performance.

Before applying the methodology to the research question, a theoretical explanation of the methodology will be provided. Assuming there are J + 1 regions. The region that experiences policy change ("1") is referred to as the treated region. The remaining regions ("J") do not experience any policy change and are used to construct the counterfactual scenario for the treated country (Chelwa et al., 2015). These remaining regions are referred to as the donor pool. The policy change happens at time T_0 with two distinct periods before the intervention and with no intervention. Before the intervention (T_0), the outcome variable for the treated country/synthetic country and the actual country are equal. After the intervention, the impact of the policy change in any given year is the difference between the outcome variable of the synthetic country and actual country (Chelwa et al., 2017).

One of the key steps in this approach identifying the appropriate predictors of the outcome variable. The appropriate predictors are those with a stable relationship with the outcome variable (McClelland & Gault, 2017). The predictors' ability to explain the variation over the pre-treatment years is limited because only their time averages are used when creating the synthetic SA (McClelland & Gault, 2017). McClelland and Gault (2017) found studies that state having a higher number of predictors compared to donors leads to a better fit.

The outcome variable for the synthetic country is unobserved for the entire post-treatment/intervention period. It, therefore, must be estimated by expressing the outcome variable of the synthetic country as a weighted average of the countries in the donor pool. First, the pre-intervention characteristics of the treated country are recreated using the donor pool. Second, the linear combination of regions is used to trace the time path of the outcome variable after treatment. This time path is the outcome variable that has been observed for the treated region in the absence of the treatment (counterfactual). The resulting synthetic control closely matches the treated region before the treatment (sanctions) and is a control for the treated region post-treatment (McClelland & Gault, 2017). The estimate of the treatment effect is equal to the difference between the counterfactual trend line and the actual trend line (Chelwa et al., 2015). Basically, after the treatment effect (sanctions), the difference in the outcomes variable (e.g., GDP per capita) between the treated region and its synthetic control estimates the impact of sanctions (McClelland & Gault, 2017).

Chelwa et a. (2015) state a "few conditions have to be met in order to get a close approximation of the treated country". These three conditions are i) regions in the donor pool should not have experienced treatment during the relevant time period and the treatment cannot affect the outcome in the pool of donor regions (McClelland & Gault, 2017), ii) the outcome variable for the regions in the donor pool should be influenced by the same factors as the outcome variable for the treated region (convex hull requirements) and iii) the weighted average of the pre-intervention outcome of the control units is equal to the pre-intervention outcome of the treated unit; treatment has no effect before the policy was enacted. These conditions require that the donor pool should be influenced by the same factors as the variable outcome variable for the treated region (Chelwa et al., 2015).

Any pre-treatment difference between the treated country and its synthetic country can be assessed by calculating the Root Mean Square Error (RMSE). The combination of countries

with their respective weights produces the lowest pre-treatment RMSE between SA and its synthetic counterpart (Chelwa et al., 2015). A large RMSE would suggest a poor pre-treatment fit between the treated region and its synthetic country (Chelwa et al., 2015). A poor fit is typically caused by weak predictors, using outcome variables from turbulent pre-treatment years as predictors, or using predictors for which the treated country has extreme values to the donor pool (McClelland & Gault, 2017).

The treatment effects might have been produced by random chance, in which case they would not be statistically significantly (Chelwa et al., 2015). Unlike the typical regression models, the SCM does provide *t*-stat or *p*-value to evaluate the statistical significance. There are three criteria to evaluate sensitivity: sensitivity of the fit between the synthetic country and the treated country outcome in the pre-treatment period, sensitivity of the synthetic control outcome in the treatment period, and sensitivity to the donor pool selection (McClelland & Gault, 2017).

3.3 Comparison with Other Methods

The alternative methods that can be used to estimate the impact of sanctions on the SA economy are case study approach, randomised control trial, difference-in-difference estimator, and fixed effects estimator. This section briefly explains each of these approaches and evaluates (advantages and disadvantages) them versus SCM.

A traditional method used for measuring the impact of an event is a randomised control trial. This approach takes randomly drawn units from a pool of similar candidates placed in one of two groups. One group receives treatment and the second group does not. The treatment effect is the difference between the outcome path for the treated group and the control group (McClelland & Gault, 2017). The advantage of the SCM is that it does not use a random control group to compare against. It uses a much more rigorous approach to select the countries that form part of the donor pool.

Case studies are also often used to solve the problem and efficiency of policies, but they do not use quantitative approaches that consider control groups (McClelland & Gault, 2017). The case studies sometimes use nearby regions as the control group, but geographic proximity is a poor metric for similarity if the "regions have substantial differences in political or cultural environments" (McClelland & Gault, 2017). The SCM addresses some of those problems by

creating a synthetic control region that simulates what the outcome path of a region would be if it did not undergo policy intervention (McClelland & Gault, 2017).

The fixed effects regression is an estimation technique used with panel data and allows for some variables to be constant or change at a constant rate over time (Cavallo, Sebastian , Iian, & Juan , 2010). The fixed effects model could contain unobserved confounders even though the effects of those confounders are restricted to be constant over time (Cavallo et al., 2010). According to Cavallo et al. (2010), the advantage of the SCM is that it allows the effects of confounding unobserved characteristics to vary with time. The SCM, however, has several other advantages (transparent and no arbitrary assumptions) that will be discussed below.

The standard difference-in-difference estimator assumes that the effects of the unobserved factors are fixed and can, therefore, difference out. It only gives a static average treatment effect (Chelwa et al., 2015) while the standard regression estimator assumes that all weights are equal to the sum of one. The difference with SCM is that the estimator restricts the weights to non-negative numbers, but the regression estimator allows for both positive and negative values. By not placing restrictions allows the regression to perfectly fit a counterfactual even when the data does not allow for a perfect fit (Chelwa et al., 2015). A criticism labelled against the difference-in-difference approach is "it is only valid if the control group units have comparable parallel trends. Therefore, estimates may be biased due to the use of state units which do not resemble pre-treatment treated unit". Consequently, the SCM approach is preferred because it is a generalisation of the difference-in-differences framework (Cunningham & Shah, 2019).

Another variance between the difference-in-difference approach and SCM is that SCM uses a subset of units for controls for comparisons rather than using all controls. The SCM selects control countries that exhibit the same pre-treatment dynamics as the treated unit (Cunningham & Shah, 2019).

The SCM is transparent. It allows for an evaluation of how well the synthetic control's outcome matches the treated region's outcome before the policy change (McClelland & Gault, 2017). Furthermore, donor regions and weights assigned to them could be easily accessed to evaluate the similarities with the treated region (McClelland & Gault, 2017).

An advantage associated with the SCM is that there are limited arbitrary assumptions to make; instead, there is a transparent estimation of the counterfactual outcome of the treated country (Billmeier & Nannicini, 2013). The comparison of economies that form the synthetic control unit is selected by an algorithm based on their similarity to the treated country before the treatment (Billmeier & Nannicini, 2013). The key assumptions are the period of evaluation, the selection of the donor pool, and associated weight. There are no assumptions that must be made about the economic structure of a specific country, the nature of the sanctions, and the likely role of third parties. It is particularly useful because there might not be a country that is identical to the primary country of analysis and matches all the set of characteristics (Pchelintsev, 2019). The advantage of the SCM is the transparent estimation of the counterfactual outcome of the treated country (Billmeier & Nannicini, 2013).

For alternative approaches for comparative analysis, the common criticism labelled against them has always been: how do they account for external events (random shocks) that could have also negatively affected the economic growth? (Pchelintsev, 2019). The SCM deals with this using a placebo effect. “The placebo test means constructing a synthetic country for all the regions in the donor pool, one at a time, and for each region estimating a treatment effect. The identified effort for the treated region is statistically significant if the probability of obtaining an effect as that of the treated region, in the empirical distribution of treatment effects, is small” (Chelwa et al., 2017, p. 109). The placebo test was used to determine if the decrease would have been because of the economic sanctions. This will be achieved by comparing the evolution of the treatment gap between the treated country and that of the other treatment gaps created for the donor pool countries. If the difference is marginal, it would indicate that the economic cost of sanctions would likely be caused by the impact of the sanctions.

Another criticism labelled against SCM is that it does not allow for a large sample such as other inferential techniques; the samples are usually quite small compared to comparative methods (Billmeier & Nannicini, 2013). The donor pool of countries (refer to Section 4.1) that can be used to construct a synthetic SA are limited and hence, the sample size is also smaller compared to other techniques. Despite this disadvantage, the advantages make the SCM a suitable methodology to apply in this research paper. The next section discusses how the SCM was applied in this research paper.

3.4 How Will the SCM Methodology be Applied in this Paper?

The research is conducted using the SCM, i.e. what was the outcome of a historical event using a counterfactual to compare against the actual. The quantitative analysis evaluates the economic cost of comprehensive sanctions imposed by the UN, EC, US and other on SA during 1985–1994 using the counterfactual analysis (Born, Müller, Schularick, & Sedláček , 2019).

This research paper measures the cost of economic sanctions by comparing SA's actual economic performance and evolution with a synthetic SA's synthetic control counterfactual constructed by the real GDP per capita of the weighted average of countries that resemble SA's historic performance. It uses data that predates the period of 1985–1994. A list of countries with similar characteristics to SA was selected to construct the synthetic SA, referred to as the donor pool. This approach assumes that if the GDP per capita before the imposition of sanctions and the synthetic are identical, it means that the markets would be identical if it were not for the influence of sanctions (Pchelintsev, 2019).

The equation that will be used for the quantitative analysis is:

- Change in annual GDP per capita (Economic cost in post-treatment period) = GDP per capita with sanctions (actual SA) – GDP per capita without sanctions (synthetic SA).
- The economic cost is measured through the decrease in GDP per capita because of the imposition of economic sanctions.
- The decrease in GDP per capita is measured as the difference with GDP per capita over the same period with and without sanctions, assuming all else equal.

3.5 Predictors Selection and Data

3.5.1 Period of analysis

The period of analysis is 1961–2000. The longer the pre-event period, the more likely the synthetic control will be accurate (Campos, Coricelli, & Luigi, 2019). The data are sourced from the World Development Indicators and the earliest data available starts in 1961. The most comprehensive study on sanctions that studied 174 cases by Hufbauer et al. (2007) provides one state/local level case information until 2000 (Hufbauer, Elliot, & Oegg, 2007). This study was relied on to determine which countries to include or exclude in the donor pool due to their

history of economic sanctions. The end period for the analysis, therefore, is 2000 because the information from the Hufbauer et al. (2007) ends in 2000.

3.5.2 Treatment period

The treatment period is 1985–1994. Starting in 1985, major economic sanctions were instituted by multilateral institutions and important trade partners to SA. The UN had a voluntary ban on new investments, trade, and other economic activities. These sanctions can be defined as severe based on the definitions in Table 2. In August 1985, SA's major lenders refused to refinance the short-term debt, leading to the rand depreciating by half. These actions are considered the start of the comprehensive economic sanctions on SA by multinational institutions (Manby, 1992). Other multinational institutions and strategic trade partners also imposed comprehensive economic sanctions on SA during this period. The key differentiator between these sanctions between earlier periods is that they were economic, comprehensive, and imposed by multilateral institutions and strategic unilateral parties. Previous cases are mild or moderate because they did not include economic sanctions by strategic trade partners such as the US. More importantly, earlier sanctions were selective and limited, while the sanctions during this period were comprehensive (financial and trade), affecting the SA economy more broadly.

Table 3.1: Definition of Sanctions Categories

#	Level	UN sanction
1	Mild	Restrictions on arms and other military hardware; typically include travel restrictions on a nation's leadership or other diplomatic sanctions as well
2	Moderate	Moderate sanctions such as fuel embargoes, restrictions on trade in primary commodities, or the freezing of public and or private assets
3	Severe	Comprehensive economic sanctions such as embargoes on all or most economic activity between UN member states and the target

Notes: This table indicates the definitions by Woods (2008) to differentiate between levels of sanctions. The sanctions applied before 1985 were either level 1 or 2. The sanctions applied after 1985 were level 3 ("severe").

The multilateral sanctions instituted by the UN ended in 1994, which is considered the end of the sanctions period because other sanctions ended earlier.

3.5.3 Predictors and outcome variable

The choice of predictors of the outcome should include variables that could estimate the path of the country affected by the intervention but should not include variables that anticipate the effects of the intervention. The countries used to estimate the synthetic control should not be affected by the event.

The outcome variable is based on the specification by Abadie et al. (2003). The outcome variable in this study is the GDP per capita. The predictors selected for this study build on the work done by Billmeier and Nannicini (2013) in estimating the impact of liberalising economies. They leveraged literature on cross-country growth regressions to construct the predictors. These were supplemented by the predictors used by Chelwa et al. (2015), Pchelintsev (2016), and Gharehozli (2017). Predictors without complete information for at least one year in the pre-treatment period were dropped; therefore, despite being used in other studies, democracy, education, inflation, and unemployment were not used. The historic outcome variables are used as predictors because they help to provide a better pre-treatment fit between synthetic SA and actual SA. Historic outcome variables are also used by Chelwa et al. (2017) in their study of cigarette consumption in SA. The predictors used in this analysis are the following: GDP per capita (1961), GDP per capita (1972), GDP per capita (1983), GDP Growth (%), population growth (%), trade (% GDP), FDI (% of GDP), and Current Account Balance (% of GDP).

3.5.4 Selection of donor pool

The selection pool was constructed by leveraging a donor pool from a SCM paper (Chelwa et al., 2017) used for South Africa. Regional countries that were not included in this list and countries with similar natural endowments were added. Any countries that did not have complete data or countries that had had sanctions during the period were removed.

This research paper relies on the selection of the donor pool used in the paper by Chelwa et al. (2015). It excludes countries from the donor pool that were classified as high-income countries because they are perceived as structurally different to SA. This paper expands the donor pool

with the South African Development Cooperation (SADC) countries. Gharehgozli (2017) used a donor pool that included regional countries, e.g., members of international bodies (e.g., OPEC) and neighbours with close economic similarities. Applying the same rationale as Gharehgozli (2017) and Pchelintsev (2016), this paper included other resource-dependent and emerging economies. Last, countries that had economic sanctions imposed during the period and or do not have a complete set of data for the post-treatment period are dropped (Chelwa et al., 2015). Hufbauer et al.'s (1990) work on economic sanctions was used to identify countries that suffered economic sanctions during the period. It is recommended to eliminate any country that might have suffered large idiosyncratic shocks during the study period. To avoid interpolation bias, the country pool should be restricted to similar countries.

The selection of the donor pool is complicated by the fact that although having sanctions imposed on a country is not binary, there is a continuum on the type of sanctions and the degree to which they were implemented. Campos et al. (2019) faced a similar challenge in analysing the impact of integration on economic growth in Europe; the continuum of membership and extent of integration differed across different areas. For simplicity, this study relied on the research by Hufbauer et al. (1990) to identify countries that had economic sanctions.

The empirical analysis is based on annual country-level panel data for the period 1961–2000. The control pool of countries includes 16 countries that have not had economic sanctions imposed on them, namely Argentina, Botswana, China, Colombia, Costa Rica, Ecuador, Indonesia, Ghana, Malaysia, Mexico, Nigeria, Panama, Peru, Philippines, Senegal, and Sri Lanka.

CHAPTER 4: DISCUSSION OF FINDINGS

4.1 Introduction

The preceding chapter discussed the research methodology employed in this study. This penultimate chapter focuses on a discussion of the findings of the study.

Table 4.1 provides a list of the donor countries and share of each in the construction of the synthetic SA. SA's counterfactual is best reproduced by a weighted average of Argentina (65.6%), Mexico (10.7%), and Peru (23.7%), two of which are Latin American countries. These three countries with their respective weights produce the lowest pre-treatment RMSE (Chelwa et al., 2017). The weight of the other countries in the pool is zero. The pre-treatment RMSE between the actual SA and its counterpart is 227 (3.7% of average GDP per capita), that means that on average, the pre-treatment difference between SA and synthetic SA is less than 5%.

Table 4.1: Country weights

Country	Weight
Argentina	65.6%
Botswana	0
China	0
Colombia	0
Costa Rica	0
Ecuador	0
Ghana	0
Indonesia	0
Malaysia	0
Mexico	10.7%
Nigeria	0
Panama	0
Peru	23.7%
Philippines	0
Senegal	0
SA	0
Sri Lanka	0

Notes: The table shows the optimal weight of countries that minimise the pre-treatment RMSE.

Table 4.2 compares the average pre-treatment characteristics for SA with its counterpart using the weights in Table 4.1. The table shows that synthetic SA resembles actual SA in most of the pre-treatment characteristics. The most significant differences are FDI and Trade as a percentage of GDP; the actual SA is over 13% and 32% higher, respectively than the synthetic SA. According to Chelwa et al. (2017), this implies that there is no linear combination of countries in the donor pool that can perfectly reproduce SA's Trade. Furthermore, it is not atypical to have predictors that differ in magnitude between the treated country and its synthetic counterpart because the treated county could have some extreme predictors (Chelwa et al., 2015).

Table 4.2: Characteristics of Treated and Synthetic SA

Characteristic	Treated	Synthetic
GDP per capita (1961)	4685,49	4822,96
GDP per capita (1972)	6274,51	6272,47
GDP per capita (1973)	6380,61	6456,67
GDP growth	4,14%	3,37%
Population growth	2,59%	1,96%
Current Account Balance	−1,47%	−2,06%
Foreign Direct Investment	26,76%	39,27%
Trade	51,27%	19,50%

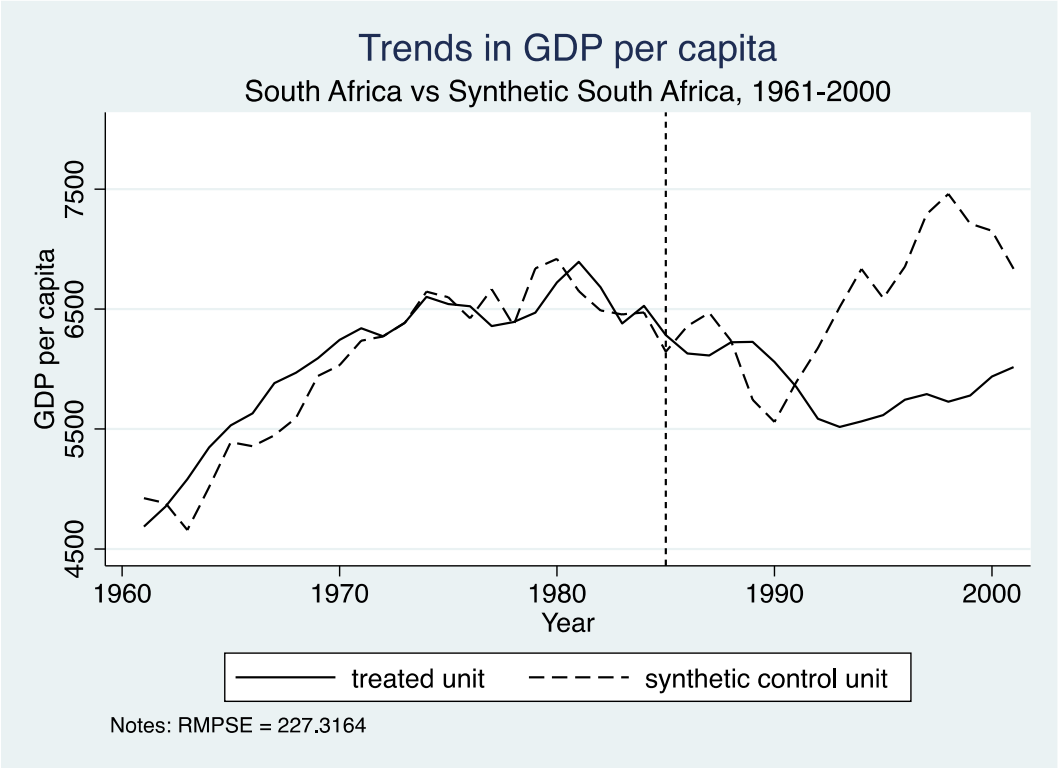
Notes: Average pre-treatment characteristics for SA and Synthetic SA. Obtained by applying the weights in Table 4.2 to the pre-treatment characteristics of the donor pool. GDP per capita is in constant 2010 US$.

Table 4.2 and the pre-treatment RMSE proves that synthetic SA largely matches SA regarding pre-treatment characteristics. Hence, synthetic SA can be used to estimate the treatment effect of the policy change. Figure 4.1 plots the GDP per capita (in constant 2010 USD) for SA and synthetic SA over the period 1961–2000. The vertical distance between SA and synthetic SA is the treatment effect (Chelwa et al., 2017). Figure 1 indicates that the synthetic SA closely tracks the GDP per capita of SA (treated unit) before the sanctions period. After the post-treatment period of 1985, the effect of sanctions leads to a decreasing trend in the outcome variable for the treated unit, but this decreasing trend starts in the early 1980s. Starting in 1991, the impact of economic sanctions on the SA economy is more pronounced. The gap between the treated unit and the synthetic control continues to widen until 1998. This could indicate that there is a substantial lag effect of the impact of sanctions on the economy. The effect of sanctions could be interrogated by evaluating SA's characteristics after the treatment and

comparing them to the pre-treatment characteristics (Chelwa et al., 2015). For example, the difference in GDP per capita between actual SA and synthetic SA is 30% in 1998.

The impact of sanctions indicated by Figure 4.1 is consistent with Coulibaly (2009) that found a decrease in economic performance rates during the sanctions period compared to the levels that would have stayed the same if the variable kept the pre-embargo average growth rates (Coulibaly, 2009). The long-term impact of sanctions on SA could support Hotton's (2016) finding that sanctions could lead to long-term damage to the productive capacity of the target country.

Figure 4.1: Synthetic versus SA GDP per Capita

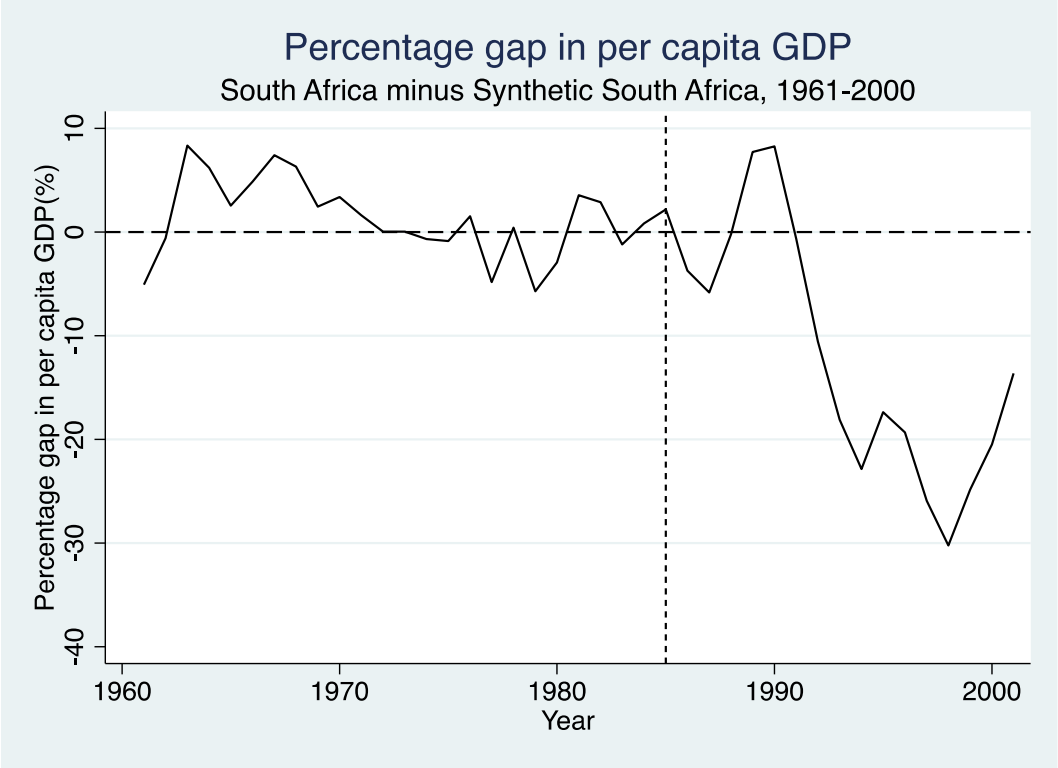


Notes: Comparison of SA and Synthetic SA GDP per capita if sanctions started in 1980 instead of 1985.

Figure 4.2 indicates the treatment effect by measuring the GDP per capita difference between SA and its synthetic counterpart. Table 4.3 shows the actual estimates of the treatment effect. During the treatment period, the GDP per capita for actual SA was less than or equal to synthetic SA for six of the years, indicating a negative treatment effect. Starting in 1991, synthetic SA's GDP per capita exceeded the actual SA, and this trend continued until peaking

in 1998. In 1998, synthetic SA had a GDP per capita of 30%. After 1998, it started to reduce each year. These results support both hypotheses listed in 1.3.

Figure 4.2: Synthetic versus SA Gap (Synthetic Treatment Effect)



Notes: The figure shows a gap in GDP per capita between SA and its synthetic counterpart over the period 1961-2000. The treatment effect is closer to zero before the treatment effect. After the treatment effect, synthetic SA has a higher GDP per capita than actual SA during the entire treatment period.

Table 4.3: Synthetic versus SA Gap (Treatment Effect)

Year	SA (GDP per capita)	Synthetic SA (GDP Per capita)	Treatment effect (GDP per capita)	Treatment effect (%)
1986	6130,94	6359,63	−228,70	−4%
1987	6113,40	6469,58	−356,18	−6%
1988	6224,41	6237,97	−13,56	0%
1989	6226,39	5745,07	481,32	8%
1990	6059,80	5558,90	500,90	8%
1991	5852,04	5891,15	−39,10	−1%
1992	5585,76	6176,04	−590,28	−11%
1993	5517,53	6516,82	−999,29	−18%
1994	5563,50	6834,96	−1271,46	−23%
1995	5615,30	6591,43	−976,13	−17%
1996	5745,11	6855,00	−1109,89	−19%
1997	5792,13	7293,85	−1501,72	−26%
1998	5728,50	7460,26	−1731,76	−30%
1999	5779,16	7214,62	−1435,46	−25%
2000	5937,63	7153,68	−1216,06	−20%

Notes: The table shows the results for the GDP per capita for actual SA, synthetic SA, the gap and a percentage of the gap for the period after the treatment effect 1985–2000.

4.2 Evaluation of Countries with Positive Weights in Table 4.1

Given Argentina's significant weight (65.6%) in synthetic SA, it is important to evaluate how the economy performed over the period. Argentina grew at an average of 3.2% between 1990 and 2000 while treated SA only grew by 1.7% (Artana, 2010). Argentina's growth is accredited to the move towards privatisation, free trade, and unrestricted capital flows (Glaeser, Tella, & Llach, 2018). By 1998, Argentina's growth came to a halt because of the economic depression (1998–2002) (Coremberg, 2014). This could explain why the gap narrows between synthetic SA and treated SA. Mexico has a weight of 10.7% in synthetic SA. Mexico's growth in the 1990s is accredited to improved openness and trade relations. After signing the NAFTA Agreement, growth restarted in 1995 at a GDP growth rate of 3.7% (Kehoe & Meza, 2011). Overall, the economic performance in Mexico improved with inflation falling to single digits. Peru grew at an average GDP growth rate of 3.16% during the 1990s after a period of reform. The historical growth performance in Peru was historically volatile but it started to outperform

since 1990 (Jenkner, 2006). All three countries that make up synthetic SA experienced exceptional GDP growth rates during the 1990s, explaining why the GDP per capita of synthetic SA increases in Figure 4.1. This growth in the GDP per capita for the three countries should be influenced by the same factors (e.g., predictor variable) as the outcome variable for SA to meet the convex hull requirements. The convex hull requirement is one of the three conditions that must be met to get a close approximation for the treated country. The other conditions are discussed in Section 3.2.

4.3 What Explains the Lag Effect?

The question of the lag effect is not fully addressed in the literature. Van Bergeijk and Van Marrewijk (1995) evaluated if sanctions need time to work and found sanctions do not work immediately but they negatively impact the economy in the long-term if the damage caused exceeds the country's ability to adjust. The US General Accounting Office (1992) found that although the effects of trade sanctions dissipate over time, most of the additional costs remain until the sanctions are lifted. The United States General Accounting Office (1992) found that the indirect costs of sanctions are slow long-term growth and sanctions-related inefficiencies in the target nation's economy. The direct costs related to limited new investment at higher costs (interest rates) caused investment to decline, leading to lower rates of long-term economic growth (United States General Accounting Office, 1992). Levy (1999) argues that while there was a lag between the imposition of sanctions and change of the regime in SA, it is unlikely that the impact would have been immediate. These arguments support why in Table 4.3 the treatment effect starts in 1991 and continued for the entire period under evaluation. The treatment effect, however, could be explained by a flat GDP per capita in SA due to the uncertainty because of the transition.

Despite the uncertainty, there was a flow of more foreign capital in the country. Interestingly, Coulibaly (2009) found that with the removal of economic sanctions and the reintegration of SA into the global economy, foreign investment started to flow into the country. For example, the World Bank accounted for $1 billion worth of developments for SA in 1993 (Coulibaly, 2009). Wesso (2003) also found that investment by foreigners increased. There, however, was volatility in the net direct investment after SA companies received exchange control approval to invest offshore. So, the limited growth could be that SA companies invested outside the country instead of investing internally, which explains the volatility in net direct investment

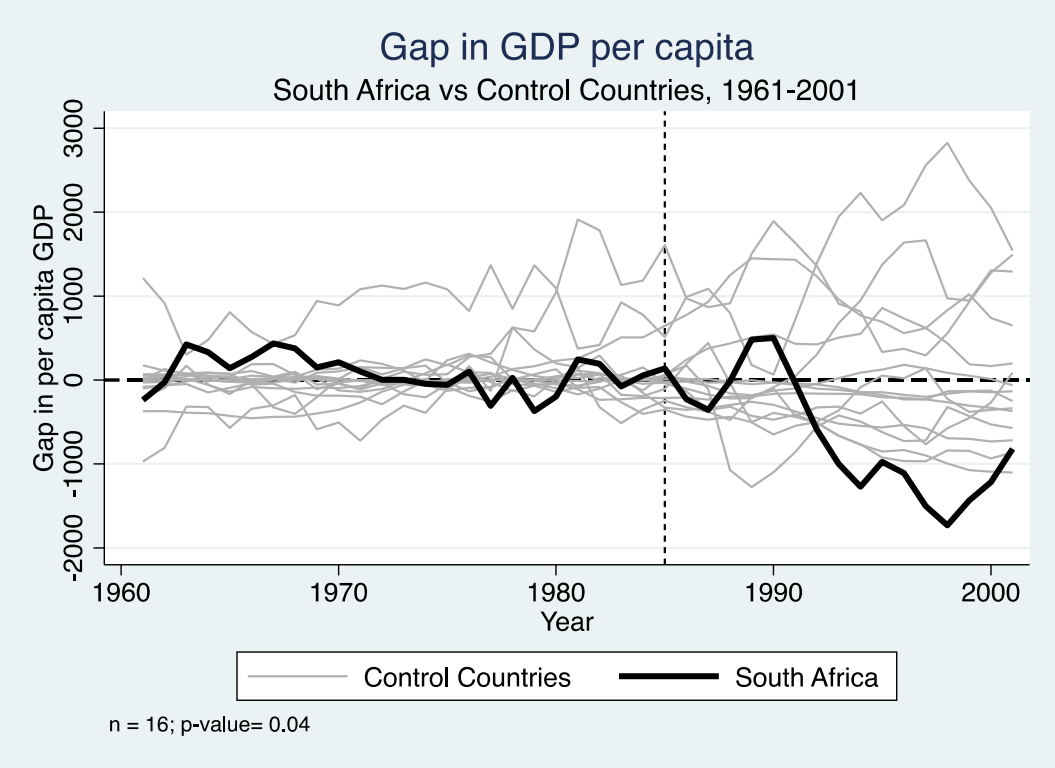
4.4 Placebo Tests

The treatment effects could have been produced by random chance, in which case they would not be statistically significantly (Chelwa et al., 2015). To address this issue, the inferential techniques suggested by Abadie et al. (2010) are applied by placebo tests. An estimated effect for SA is not considered significant if it is not large enough relative to the placebo estimates (Barseghyan, 2019).

SA is placed in the donor pool and each country of the countries in Table 4.1 is subjected to the same synthetic control approach applied to SA. This results in a "vect" can be compared. SA's treatment effects would be statistically significant if the probability of obtaining a treatment effect as large as SA's, in the distribution effects, were small" (Chelwa et al., 2015, p. 121).

Figure 4.3 shows the treatment effect for donor countries. The share indicates that SA has the largest negative treatment effect and one of the better fits. Two countries have a better fit than SA, namely Ecuador and the Philippines. Ecuador and the Philippines have a higher probability of having a placebo effect due to the better fit (Gharehgozli, 2017). The Philippines has a treatment effect larger than SA in percentage terms. The probability of any country achieving a treatment effect that is as large as SA is [1/16 = 6.25%], which is a small significance level given the small sample size and it is below the 10% threshold (Chelwa et al., 2015).

Figure 4.3: Placebo Effect



Barseghyan (2019) recommend that if the estimated placebo effect is large due to a poor fit in the pre-intervention period, the distribution of ratios of post-to-pre-sanctions RMSPEs are further evaluated. This analysis was not conducted because the estimated placebo effect is not large. A 10% level is recommended as a stringent threshold for inferring under the SCM given that donor pools usually contain a small number of countries (Chelwa et al., 2015). These results, therefore, are statistically significant at the 10% threshold (Cavallo et al., 2010).

4.5 Robustness

This section evaluates the robustness of the treatment effects. First, the treatment effects are evaluated to determine if they are sensitive to the composition of the donor pool. This is done by excluding the countries with positive donor weights and running a new iteration of estimating the treatment effect. The purpose of this exercise is to ensure that the estimated effects are not driven by single donor countries with a positive weight (Chelwa et al., 2015). Second, the timing of the onset of the treatment accounts for any delays in the implementation of treatment.

Figures 4.4, 4.5, and 4.6 show the results of excluding the donor countries with positive weights. All three charts show a similar trend to chart 1 but with Argentina having a poorer pre-treatment fit. The chart with Argentina excluded from the donor pool has a poorer pre-treatment fit but the shape of the chart is similar post-treatment.

Table 4.4 compares the actual treatment effect results with the results from each positive country left out. The treatment effects are illustrated as the annual percentage deviation from the respective counterfactual trend line. Column (2) shows the previous results while columns (3), (4), and (5) show the results from excluding donor countries with positive weights from the donor pool. The treatment effect across all columns reaches 29% or more by 1998, which is consistent with the 30% found in the main results. The RMSE without Argentina in the pool is 3.5 times poorer than the main results.

Although the pre-treatment results are poorer when Argentina is removed from the donor pool, the treatment effect results showed that the results are not dependent on the composition of the donor pool. The results below indicate that the treatment effects estimates are independent of the composition of the donor pool (Chelwa et al., 2015).

Figure 4.4: SA versus Synthetic SA (GDP per capita) – Excluding Mexico

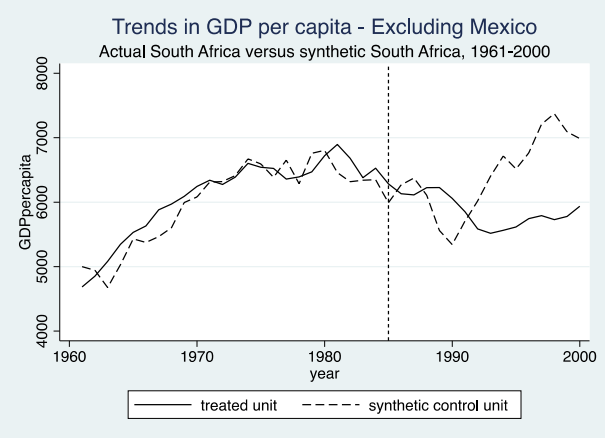


Figure 4.5: SA versus Synthetic SA (GDP per capita) – Excluding Peru

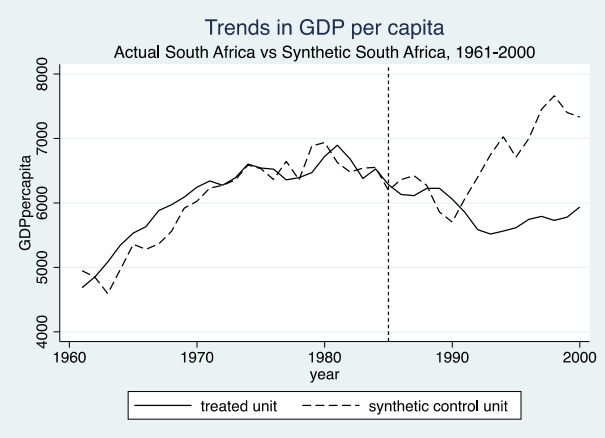


Figure 4.6: SA versus Synthetic SA (GDP per capita) – Excluding Argentina

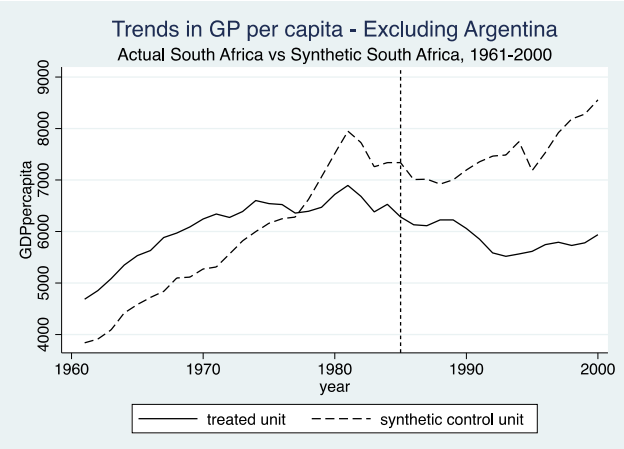
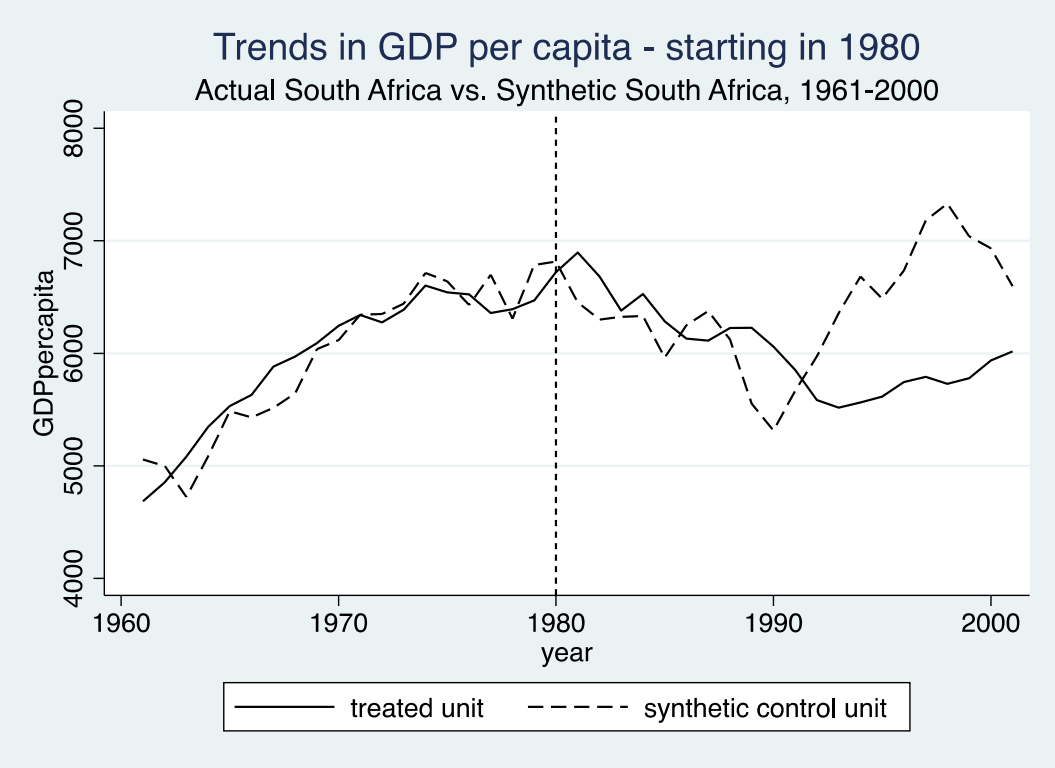


Table 4.4: Robustness: Comparison of treatment effect with country excluded

Year	Main Results	Excluding Argentina	Excluding Mexico	Excluding Peru
1986	−4%	−14%	−2%	−4%
1987	−6%	−15%	−4%	−5%
1988	0%	−11%	2%	−1%
1989	8%	−12%	11%	6%
1990	8%	−19%	12%	6%
1991	−1%	−26%	3%	−4%
1992	−11%	−34%	−8%	−15%
1993	−18%	−36%	−16%	−22%
1994	−23%	−39%	−21%	−26%
1995	−17%	−28%	−16%	−20%
1996	−19%	−31%	−18%	−22%
1997	−26%	−37%	−24%	−29%
1998	−30%	−43%	−29%	−34%
1999	−25%	−43%	−23%	−28%
2000	−20%	−44%	−18%	−23%
RMSE	227	818	238	258

The final robustness check is related to the start of the treatment, so the economic sanctions only started in 1980 (5 years before the sanctions started). Figure 4.5 shows that the counterfactual trend line is similar in Figure 4.4, but also gives the impression that the economic decline in both actual and synthetic SA started in the early 1980s. This trend, however, is not due to sanctions because it affects both the synthetic and actual SA. The global economy suffered from the oil crisis. More importantly, these results support the view of the predictive power of the SCM, and for the estimated effect of the actual sanctions of 2011 (Gharehgozli, 2017).

Figure 4.7: Synthetic SA versus Actual SA (GDP per capita) – Sanctions starting in 1980



CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion and Recommendations

This study aimed to evaluate the economic cost of sanctions that were imposed on SA in the mid-1980s. The economic sanctions imposed on SA between 1985 and 1995 by the UN, US, EC, Nordic Council and other important trade partners led to an economic cost of approximately 30% by 1998. This negative impact on the economy, measured by the GDP per capita, continued until 1998.

The hypotheses of the study are the following:

- H_1: Economic sanctions had a large negative impact on SA's GDP per capita between 1985 and 1994
- H_2: Economic sanctions on SA continued to have a negative impact after they had ended

The literature review on economic sanctions focuses on evaluating if sanctions were effective and explains the level of their effectiveness. The effects of economic sanctions on the economy are evident in the reduction of benefits associated with trade and in the withdrawal of foreign sources of capital. Production inefficiency is caused by the increasing cost of capital and the lack of the availability of important inputs. Neunkirch and Neumeier (2014) found that UN sanctions led to a decrease of 2.3-3.5% in the target state's real GDP per capita growth.

SA has been a case study for evaluating sanctions due to the long history of sanctions against the apartheid government. A significant gap in the analysis is that none of the existing studies that were conducted estimate the economic cost of sanctions by comparing the growth path (GDP per capita) after the imposition of sanctions versus had sanctions not been imposed on SA. The few studies that do evaluate the economic cost sanctions only evaluate the cost of sanctions during the time that they were implemented instead of considering the longer-term effects.

SA has a long history of non-economic sanctions. The key differentiator between these sanctions between earlier periods and those that started in 1985 is that they were economic, comprehensive, imposed by multilateral institutions, and strategic unilateral parties. These sanctions were severe while earlier episodes were either mild or moderate. Previous cases were less severe because they were mostly non-economic, except for a few unilateral cases. These

few cases of economic sanctions were selective and limited, while the sanctions during 1985–1994 were multilateral and compressive (financial and trade) affecting the SA economy more broadly. In the mid-1980s, major strategic trading partners (EC, UN, and US) imposed comprehensive and economic sanctions against SA. The US sanctions lasted until 1991, while the UN sanctions ended in 1994.

Using the SCM, the economic cost of sanctions is measured by estimating the difference between the treated country (SA) and the counterpart (synthetic SA). Synthetic SA reflects actual SA in the pre-treatment period, indicating that it is a good counterfactual. The results indicate that the economic cost is most pronounced between 1991 and 1998. This signals that the economic sanctions continued to have a lag effect even after they were concluded. The gap between synthetic SA and actual SA in the GDP per capita (treatment effect) reaches 30% in 1998. Thus, results support both hypotheses presented in section 1.3 because they indicate a large negative impact on South Africa's GDP during the sanctions period. Sanctions continued to have a negative effect after they had ended.

The results could be attributed to the treatment effect (sanctions) on the treated country (actual SA). SA has the largest negative treatment effect and the line better fits when compared against treatment effects of other comparable. The placebo test reveals that the results are statistically significant at the 10% threshold.

The findings are also robust to the composition of the donor pool and the start of the sanctions. There is a clear treatment effect when the countries with positive weights are removed from the donor pool one at a time, although the pre-treatment fit is poorer when Argentina is removed from the composition pool. Even when the treatment event was moved to 1980, the results are similar. Furthermore, the results are not sensitive to the composition of the donor pool or to the start of the sanctions.

5.2 Implications for policymakers

These results have implications for both the target nation and the sender. For the sender, the results illustrate that sanctions have an economic cost that lasts for a long period. The results also appeal to those who hold that sanctions that impose an economic cost are more likely to lead to a desired outcome (i.e. the end of apartheid). This implication, however, cannot be concluded from this paper. For the

target nation, the results mean that policymakers should acknowledge that any policy that leads to sanctions may lead to a severe and long-lasting impact on the economy.

5.3 Limitations of the Study

A limitation of this study is that it does not evaluate the role that sanctions played in South Africa's transition to democracy. Potential areas for future investigation include estimating the humanitarian impact of the sanctions imposed on South Africa by applying the SCM approach to other sanctions episodes of the past.

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